Finance, Governance and Inclusive Education in Sub-Saharan Africa

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January 2020

A G D I Working Paper

WP/20/037

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Forthcoming: Social Responsibility Journal

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[1] This working paper also appears in the Development Bank of Nigeria Working Paper Series.

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Finance, Governance and Inclusive Education in Sub-Saharan Africa

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Abstract

This research assesses the importance of credit access in modulating governance for gender inclusive education in 42 countries in Sub-Saharan Africa with data spanning the period 2004-2014. The Generalized Method of Moments is employed as empirical strategy. The following findings are established. First, credit access modulates government effectiveness and the rule of law to induce positive net effects on inclusive "primary and secondary education". Second, credit access also moderates political stability and the rule of law for overall net positive effects on inclusive secondary education. Third, credit access complements government effectiveness to engender an overall positive impact on inclusive tertiary education. Policy implications are discussed with emphasis on Sustainable Development Goals.

JEL Classification: I28; I30; G20; O16; O55
Keywords: Finance; Governance; Sub-Saharan Africa; Sustainable Development

1. Introduction

Two main factors underpin the positioning of this study on the role of financial access in complementing good governance to promote inclusive education in sub-Saharan Africa (SSA), notably: (i) the importance of financial development and governance in development outcomes and (ii) gaps in the attendant literature. The two factors are expanded in chronological order[2].

First, undoubtedly, good governance is very important in driving the economic prosperity of nations and financial development can facilitate the relevance of good governance in economic development. This importance of financial development is based on the substantially documented relevance of financial access in a plethora of positive development externalities. The contemporary literature supporting this perspective includes: Odhiambo (2010, 2013, 2014); Bocher, Alemu and Kelbore (2017); Wale and Makina (2017); Daniel (2017); Chikalipah (2017); Osah and Kyobe (2017); Oben and Sakyi (2017); Boadi, Dana, Mertens, and Mensah (2017); Iyke and Odhiambo (2017); Ofori-Sasu, Abor and Osei (2017); Chapoto and Aboagye (2017); Tchamyou (2019, 2020) and Tchamyou, Erreygers and Cassimon (2019)[3]. On the other hand, like financial development, good governance has also been established to promote economic development in Africa on a plethora of fronts, such as economic and human developments (Efobi, 2015; Asongu & Kodila-Tedika, 2016; Ajide & Raheem, 2016a, 2016b; Pelizzo, Araral, Pak & Xun, 2016; Pelizzo & Nwokora, 2016, 2018; Nwokora & Pelizzo 2018). One of such externalities is the delivery of public commodities which includes quality education. This research builds on the documented relevance of both financial development and good governance in promoting education to assess how financial access modulates the effect of governance on inclusive education. The positioning of the study is also motivated by an apparent gap in the literature.

Second, the contemporary inclusive education literature has failed to tackle the problem statement being analyzed in this research. The attendant literature has focused on

[2] "Inclusive education" "gender parity education" and "gender inclusive education" are used interchangeably throughout the study. Moreover, whereas the term gender can from a broad perspective denote many identities that may not specifically reflect entrenched ideas related to male and female, the concept of gender as applied in this study is binary in terms male and female, in line with recent gender inclusive literature (Asongu, Efobi, Tanankem & Osabuohien, 2020).

[3] This research is also motivated by the need to depart from a contemporary strand of African financial development literature that has failed to address the problem statement under consideration (Boamah, 2017; Amponsah, 2017; Danquah, Quartey & Iddrisu, 2017; Kusi, Agbloyor, Ansah-Adu & Gyeke-Dako, 2017; Asongu, Nwachukwu & Tchamyou, 2017; Boateng, Asongu, Akamavi & Tchamyou, 2018; Tchamyou, 2019, 2020; Senga, Cassimon & Essers, 2018; Bayraktar & Fofack, 2018; Asongu, Batuo, Nwachukwu & Tchamyou, 2018a; Senga & Cassimon, 2018; Asongu, Raheem & Tchamyou, 2018b; Kusi & Opoku-Mensah, 2018; Dafe, Essers & Volz, 2018; Gyeke-Dako, Agbloyor, Turkson & Baffour, 2018; Bokpin, Ackah & Kunawotor, 2018).

among others: the experience of gender in the inclusive education of children that are victim of physical impairments in the Eastern and Western regions of Africa (Hui, Vickery, Njelesani & Cameron, 2018); the imperative of technology that is assistive in the renegotiation of the involvement of handicapped students in schools in North Africa (Clouder *et al*., 2019); perceptions of teachers and parents on the underlying issues (Magumise & Sefotho, 2020); engagement of handicapped students in higher learning institutions in South Africa (Mutanga, 2018); the relevance of the intervention of teachers on the preparedness of teachers to dispense knowledge to children that are affected by physical disabilities (Carew, Deluca, Groce & Kett, 2019); the effectiveness of special and inclusive teaching in early education (Majoko, 2018); systematic practice and thinking for the improvement of inclusive education (Tlale & Romm, 2018); importance of information and communications technologies in promoting quality education (Asongu & Odhiambo, 2019a, 2019b); the attitudes and knowledge of teachers towards social inclusion (Monico *et al*., 2020); the nexus between communitarianism and ecojustice education in Africa (Kruger, le Roux & Teise, 2020); achieving gender equality in education in SSA within the framework of millennium development goals (MDGs) and sustainable development goals (SDGs) (Koissy-Kpein, 2020); academic achievement from home-based educational multi-correlates (Haynes, 2020) and the importance of higher education in making single mothers become more effective role models (Greenberg & Shenaar-Golan, 2020).

This scientific inquiry is tailored within the framework of applied econometrics that is motivated by intuition instead of pre-established theoretical underpinnings. In so doing, this research is consistent with a growing strand of literature in arguing that the usefulness of applied econometrics is not exclusively oriented towards to acceptance or refutation of prior theoretical underpinnings (Costantini & Lupi, 2005; Narayan, Mishra & Narayan, 2011; Asongu & Nwachukwu, 2016a; Asongu & Odhiambo, 2018). Hence, the purpose of the next paragraph is primarily to demonstrate that the intuition for assessing how financial access complements good governance to promote inclusive education is sound and withstands logical scrutiny.

As critically discussed in the first paragraphs of this introduction, the intuition for complementing good governance with financial access in the promotion of inclusive education is sound because good governance is a necessary but not a sufficient condition for economic development. Accordingly, in order for good governance policies designed to promote inclusive education to be effective, complementary mechanisms that provide the financial means with which to finance education are warranted. For instance, if good

governance initiatives designed to promote education are concurrently engaged with initiatives that improve conditions for access to credit to existing users of formal banking establishments as well as provide incentives for the previously unbanked population (i.e.to own bank accounts and have access to credit), it is very likely that, *ceteris paribus*, the general conditions in society for economic development and by extension, inclusive prosperity within the framework of gender parity education, will be improved. In a nutshell, the argument underpinning the interactive specification is simple to follow: governments do not act in isolation when promoting inclusive education, but tailor their policies such that parents can have access to credit needed to comply with financial obligations required for the education of their children.

From a notional perspective, the conception and definition of good governance employed in this study are broadly consistent with conditions that promote economic development and by extension inclusive development within the framework of inclusive education. In essence: "*The first concept is about the process by which those in authority are selected and replaced (Political Governance): voice and accountability and political stability. The second has to do with the capacity of government to formulate and implement policies, and to deliver services (Economic Governance): regulatory quality and government effectiveness. The last, but by no means least, regards the respect for citizens and the state of institutions that govern the interactions among them (Institutional Governance): rule of law and control of corruption*" (Andres, Asongu & Amavilah, 2015, p. 1041). Moreover, the direction of finance that complements good governance needs to be clarified in the context of the study. It is about financial access modulating or complementing good governance to influence inclusive education. In other words, while good governance is worthwhile for inclusive education, it should be complemented with financial development in the perspective of more access to credit (to households, corporations and government) in order to influence inclusive education.

The closest study to this paper in the literature is Asongu and Odhiambo (2020) which has investigated linkages between finance, governance and insurance sector development. This inquiry departs from the underlying study by focusing on education instead of insurance sector development. Hence, both studies are different in terms of problem statement, findings and implications of the findings.

The remainder of the study is organized as follows. The data and methodology are covered in section 2. Section 3 presents the empirical findings whereas section 4 concludes with implications and future research directions.

2. Data and methodology

2.1 Data

The study is focused on forty-two countries in the sub-region of SSA using data spanning the period 2004-2014[4]. The geographical and temporal scopes of the study are motivated by data availability constraints at the time the study was carried out. The data come from a multitude of sources. First, good governance indicators are obtained from World Governance Indicators of the World Bank. These include: (i) measures of political governance which are captured with political stability and "voice & accountability"; (ii) indicators of economic governance which are reflected by government effectiveness and regulation quality and (iii) proxies for institutional governance which are captured with corruption-control and the rule of law. These adopted governance indicators are consistent with the conceptual clarification provided in the introduction in the light of the attendant literature (see Andrés *et al*., 2015). Moreover, the choice of variables and their corresponding categorizations are in accordance with contemporary African governance literature (Andrés *et al*., 2015; Pelizzo, Araral, Pak & Xun, 2016; Pelizzo & Nwokora, 2016, 2018; Asongu & Odhiambo, 2019c; Nwokora & Pelizzo 2018; Oluwatobi, Efobi, Olurinola, Alege, 2015; Ajide & Raheem, 2016a, 2016b; Asongu, le Roux, Nwachukwu & Pyke, 2019).

Second, private domestic credit that is used to proxy for financial access is obtained from the Financial Development and Structure Database (FDSD) of the World Bank. The justification for adopting the credit channel of financial access as opposed to the deposit channel is consistent with recent literature justifying the preference for the credit mechanism because it is intuitively more connected to financial access (Tchamyou, 2019, 2020). This is essentially because from logic and common sense, the deposit channel is only relevant for financial access when mobilized deposits have been transformed into credit and granted to households and other economic agents.

Third, the education and control variables are obtained from World Development Indicators (WDI) of the World Bank. The adopted inclusive education variables are related to: "gender parity primary and secondary education", "gender parity secondary education" and "gender parity tertiary education". The adoption of variables reflecting all levels of education

[4]The 42 countries include: "Angola, Benin, Botswana, Burundi, Cabo Verde, Cameroon, Central African Republic, Chad, Comoros, Congo Democratic Republic, Congo Republic, Côte d'Ivoire, Djibouti, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritius, Mozambique, Namibia, Niger, Nigeria, Rwanda, Sao Tome & Principe, Senegal, Seychelles, Sierra Leone, South Africa, Sudan, Swaziland, Tanzania, Togo, Uganda and Zambia".

is motivated by the attendant education, lifelong learning and knowledge economy literature which has argued for the imperative to take more education indicators on board for robust empirical analyses and opportunity of more policy options from the corresponding empirical analyses (Asiedu, 2014; Tchamyou, 2017; Asongu & Tchamyou, 2016, 2019, 2020).

Before engaging the empirical strategy adopted for this study, it is also worthwhile to clarify why only one control variable is adopted in the conditioning information set. First and foremost, the empirical approach underpinning this study is the Generalized Method of Moments (GMM) and the attendant GMM-centric literature is consistent with the adoption of limited elements in the conditioning information set in so far as such an adoption is motivated by the need to derive robust estimated coefficients. Accordingly, even when the "collapse" option is employed in GMM empirical analysis, the concern of instrument proliferation can still be apparent if many control variables are involved in the conditioning information set. Some examples of contemporary GMM-centric studies that have employed limited elements in the conditioning information set in order to curtail the underlying concern of biased estimated coefficients include Bruno, De Bonis and Silvestrini (2012) who have adopted two control variables. Furthermore, there is also a stream of the literature which has adopted no control variable in the conditioning information set (see Osabuohien & Efobi, 2013; Asongu & Nwachukwu, 2017).

With respect of the anticipated sign from the adopted control variable which is remittances, as recently documented by Ssozi and Asongu (2016), remittances are used for consumption purposes for the most part. Hence, it follows that because the paying of school fees and corresponding academic needs are related to consumption, a positive association between remittances and inclusive education can be expected. However, it is worthwhile to further articulate that the importance of remittances in promoting gender inclusive education can differ across educational levels. For instance, while remittances can promote "gender inclusive secondary education", it could also negatively influence "gender inclusive tertiary education" if less women make the transition from secondary to higher education. Appendix 1 provides the definitions and sources of variables while Appendix 2 discloses the summary statistics. The correlation matrix is provided in Appendix 3.

2.2 Methodology

2.2.1 GMM Specification

In accordance with the motivation outlined in the data section for employing a GMM empirical strategy, the adoption of the estimation approach is further informed by four main

motivations in the scholarly literature (Asongu & Odhiambo, 2019d; Efobi, Tanaken & Asongu, 2018). The motivational elements are expanded in turn in no order of importance. First, a primary requirement for the employment of the estimation technique is that the number of agents or cross sections should exceed the number of time periods in terms of numerical value. This criterion is verified in the data structure because the research is dealing with 42 countries and each country is sampled for 11 years or the period 2004-2014. Second, persistence is apparent in the outcome variables being investigated because the correlation coefficients between the levels and first difference series' of the attendant inclusive education variables exceed 0.800 which, has been documented to be the rule of thumb for the establishment of persistence in an outcome variable in GMM-centric literature (Meniago & Asongu, 2018; Tchamyou *et al*., 2019). Third, owing to the panel data structure of the study, it is apparent that cross-country differences are considered in the estimation processes. Fourth, concerns regarding endogeneity are tackled from two main fronts. On the one hand, reverse causality or simultaneity is taken on board because internal instruments are employed in the estimation exercise. On the other, the unobserved heterogeneity is controlled in terms of years.

The GMM empirical strategy adopted by this study is the Roodman (2009a, 2009b) extension of Arellano and Bover (1995) which has been documented to provide more robust estimates because it has an option that collapses instruments and hence, contributes to limiting instrument proliferation (Asongu & Nwachukwu, 2016b; Boateng, Asongu, Akamavi & Tchamyou, 2018).

The following equations in level (1) and first difference (2) summarise the standard *system* GMM estimation procedure.

$$E_{i,t} = \sigma_0 + \sigma_1 E_{i,t-\tau} + \sigma_2 F_{i,t} + \sigma_3 G_{i,t} + \sigma_4 FG_{i,t} + \sigma_5 R_{i,t} + \eta_i + \xi_t + \varepsilon_{i,t} \quad (1)$$

$$\begin{aligned} E_{i,t} - E_{i,t-\tau} = {} & \sigma_1 (E_{i,t-\tau} - E_{i,t-2\tau}) + \sigma_2 (F_{i,t} - F_{i,t-\tau}) + \sigma_3 (G_{i,t} - G_{i,t-\tau}) + \sigma_4 (FG_{i,t} - FG_{i,t-\tau}) \\ & + \sigma_5 (R_{i,t} - R_{i,t-\tau}) + (\xi_t - \xi_{t-\tau}) + (\varepsilon_{i,t} - \varepsilon_{i,t-\tau}) \end{aligned} \quad (2)$$

where, $E_{i,t}$ reflects an inclusive education variable (i.e. "primary and secondary education", secondary education and tertiary education) of country i in period t, σ_0 is a constant. F denotes financial access of country i in period t. G represents a governance dynamic (i.e. rule of law, corruption-control, government effectiveness, regulation quality, "voice & accountability" and political stability) of country i in period t. FG reflects interactions between financial access and governance indicators ("credit access" × "rule of law"; "credit access" × "corruption-control"; "credit access"× "government effectiveness"; "credit access"

× "regulation quality"; "credit access" × "voice & accountability" and "credit access"× "political stability"). R denotes remittances of country i in period t. τ represents the coefficient of auto-regression which is one within the framework of this study because a one year lag is sufficient to capture past information, ξ_t is the time-specific constant, η_i is the country-specific effect and $\varepsilon_{i,t}$ the error term.

2.2.2 Identification, exclusion restrictions and simultaneity

For a GMM specification to be robust, a discourse on identification, exclusion restrictions and simultaneity is indispensible. The identification approach consists of clarifying three sets of variables, notably, the: outcome, predetermined or endogenous explaining and strictly exogenous variables (Asongu & Nwachukwu, 2016c; Tchamyou & Asongu, 2017). In the light of the attendant literature, years are considered as strictly exogenous whereas the predetermined variables are the independent variables of interest (i.e. finance and governance) and the control variable (i.e. remittances). The process of identification is in line with contemporary GMM-centric literature (Boateng *et al*., 2018; Tchamyou *et al*., 2019). This identification approach is broadly in line with Roodman (2009b) in the perspective that, the author has argued that it is not very likely for years to become endogenous after a first difference[5]. The corresponding assumption underpinning the exclusion restriction is that the identified strictly exogenous variables influence the outcome variables under consideration exclusively through the mechanisms associated with the predetermined or endogenous explaining variables.

The criterion employed to assess the exclusion restriction assumption is the Difference in Hansen Test (DHT). The null hypothesis of the test is the position that the exclusion restriction assumption holds. In other words, the instruments are valid because they affect the outcome variables through the identified endogenous explaining mechanisms. Hence, in the findings that are disclosed in the next section, the identification strategy is valid if the alternative hypothesis corresponding to the DHT is rejected. The insights into the identification, exclusion restrictions and corresponding validation criterion are not different from a traditional instrumental variable (IV) technique in which for the instruments to be valid, the Sargan/Hansen test should not be rejected (Beck, Demirgüç-Kunt & Levine, 2003; Asongu & Nwachukwu, 2016d).

[5]Hence, the procedure for treating *ivstyle* (years) is 'iv (years, eq(diff))' whereas the *gmmstyle* is employed for predetermined variables.

The issue of simultaneity mainly builds on concerns of reverse causality that are for the most part apparent in a regression exercise. For instance, while the focus of the study is on how financial access modulates the effect of governance on inclusive education, a measure of governance is contingent on the type of infrastructure like education. The attendant concern of reverse causality or simultaneity which is one of the causes of endogeneity is addressed by means of employing the lagged regressors as forward differenced instruments. In essence, fixed effects that can obviously influence the investigated nexuses are removed with the use of Helmert transformations, in line with GMM-centric literature (Arellano & Bover, 1995; Love & Zicchino, 2006). The attendant transformations entail forward averaged-differencing of the indicators, contrary to deducting past observations from present observations. Accordingly, the mean of future observations is deducted from the indicators. These underlying transformations reflect parallel or orthogonal conditions between lagged observations and forward-differenced variables. Irrespective of the number of lags involved in the regression exercise, for data loss to be minimized as much as possible, the corresponding transformation is considered for all observations, except for the final observation in each cross section.

3. Empirical results

The empirical findings are provided in this section in Tables 1-3. Table 1 focuses on nexuses between governance, finance and inclusive "primary and secondary education" while Table 2 is concerned with linkages between governance, finance and inclusive secondary education. By extension, Table 3 provides results on connections between governance, finance and tertiary education. In each table, the specifications are classified into three main categories pertaining to: (i) political governance (i.e. entailing political stability and "voice & accountability"); (ii) economic governance (i.e. encompassing government effectiveness and regulation quality) and (iii) institutional governance (i.e. embodying the rule of law and corruption-control). For all six specifications characteristic of each table, four principal criteria inform the research on the validity of estimated models[6]. Owing to these criteria, the estimated models are valid overwhelmingly.

[6] "*First, the null hypothesis of the second-order Arellano and Bond autocorrelation test (AR (2)) in difference for the absence of autocorrelation in the residuals should not be rejected. Second the Sargan and Hansen over-identification restrictions (OIR) tests should not be significant because their null hypotheses are the positions that instruments are valid or not correlated with the error terms. In essence, while the Sargan OIR test is not robust but not weakened by instruments, the Hansen OIR is robust but weakened by instruments. In order to restrict identification or limit the proliferation of instruments, we have ensured that instruments are lower than the number of cross-sections in most specifications. Third, the Difference in Hansen Test (DHT) for exogeneity of instruments is also employed to assess the validity of results from the Hansen OIR test. Fourth, a Fisher test for the joint validity of estimated coefficients is also provided*" (Asongu & De Moor, 2017, p.200).

Table 1: Governance, Finance and "Inclusive primary and secondary education"

	Dependent variable: Inclusive Primary and Secondary Education (PSSE)					
	Political Governance		Economic Governance		Institutional Governance	
	Political Stability	Voice & Accountability	Government Effectiveness	Regulation Quality	Rule of Law	Corruption-Control
PPSE(-1)	**0.929*** (0.000)**	**0.925*** (0.000)**	**0.899*** (0.000)**	**0.925*** (0.000)**	**0.932*** (0.000)**	**0.980*** (0.000)**
Private Domestic Credit (Credit)	-0.0001 (0.129)	**-0.0001** (0.024)**	**-0.0001** (0.016)**	**-0.0001** (0.047)**	-0.00005 (0.707)	-0.00006 (0.111)
Political Stability (PolS)	0.006 (0.275)	---	---	---	---	---
Voice & Accountability(VA)	---	**0.010** (0.045)**	---	---	---	---
Government Effectiveness (GE)	---	---	**0.023*** (0.004)**	---	---	---
Regulation Quality (RQ)	---	---	---	**0.017* (0.062)**	---	---
Rule of Law (RL)	---	---	---	---	**0.024** (0.048)**	---
Corruption-Control (CC)	---	---	---	---	---	-0.005 (0.197)
Credit × PolS	-0.00009 (0.485)	---	---	---	---	---
Credit × VA	---	-0.00005 (0.357)	---	---	---	---
Credit × GE	---	---	**-0.0002*** (0.006)**	---	---	---
Credit × RQ	---	---	---	-0.0001 (0.214)	---	---
Credit × RL	---	---	---	---	**-0.0004*** (0.003)**	---
Credit × CC	---	---	---	---	---	0.00009 (0.195)
Remittances	0.00002 (0.811)	0.00004 (0.740)	0.00005 (0.705)	0.0001 (0.376)	0.0001 (0.456)	-0.00004 (0.685)
Time Effects	Yes	Yes	Yes	Yes	Yes	Yes
Net Effects	na	na	0.018	na	0.015	na
AR(1)	(0.027)	(0.031)	(0.034)	(0.030)	(0.028)	(0.028)
AR(2)	**(0.265)**	**(0.307)**	**(0.298)**	**(0.289)**	**(0.268)**	**(0.279)**
Sargan OIR	(0.070)	(0.073)	(0.033)	(0.017)	(0.017)	(0.017)
Hansen OIR	**(0.334)**	**(0.203)**	**(0.138)**	**(0.259)**	**(0.380)**	**(0.182)**
DHT for instruments						
(a)Instruments in levels						
H excluding group	(0.084)	(0.108)	(0.053)	**(0.110)**	(0.043)	(0.027)
Dif(null, H=exogenous)	**(0.591)**	**(0.340)**	**(0.332)**	**(0.424)**	**(0.788)**	**(0.558)**
(b) IV (years, eq(diff))						
H excluding group	**(0.156)**	(0.016)	**(0.301)**	(0.058)	**(0.173)**	**(0.292)**
Dif(null, H=exogenous)	**(0.466)**	**(0.709)**	**(0.134)**	**(0.547)**	**(0.507)**	**(0.184)**
Fisher	**2003.16***	**1994.23***	**769036.13***	**5098.54***	**909.23***	**895307.63***
Instruments	28	28	28	28	28	28
Countries	33	33	33	33	33	33
Observations	217	217	217	217	217	217

***,**,*: significance levels at 1%, 5% and 10% respectively. DHT: Difference in Hansen Test for Exogeneity of Instruments Subsets. Dif: Difference. OIR: Over-identifying Restrictions Test. The significance of bold values is twofold. 1) The significance of estimated coefficients and the Fisher statistics. 2) The failure to reject the null hypotheses of: a) no autocorrelation in the AR(1) & AR(2) tests and; b) the validity of the instruments in the Sargan and Hansen OIR tests. The mean of private domestic credit is 20.913. na: not applicable because at least one estimated coefficient needed for the computation of net effects is not significant.

Table 2: Governance, Finance and Inclusive Secondary School Education (SSE)

	Dependent variable: Inclusive Secondary Education (SSE)					
	Political Governance		Economic Governance		Institutional Governance	
	Political Stability	Voice & Accountability	Government Effectiveness	Regulation Quality	Rule of Law	Corruption-Control
SSE(-1)	**0.885*** (0.000)**	**0.929*** (0.000)**	**0.901*** (0.000)**	**0.925*** (0.000)**	**0.877*** (0.000)**	**0.976*** (0.000)**
Private Domestic Credit (Credit)	**-0.0006*** (0.004)**	**-0.0004*** (0.007)**	**-0.0004** (0.029)**	**-0.0001** (0.047)**	**-0.0006*** (0.000)**	-0.0001 (0.317)
Political Stability (PolS)	**0.046*** (0.004)**	---	---	---	---	---
Voice & Accountability(VA)	---	0.001 (0.892)	---	---	---	---
Government Effectiveness (GE)	---	---	0.020 (0.314)	---	---	---
Regulation Quality (RQ)	---	---	---	**0.017* (0.062)**	---	---
Rule of Law (RL)	---	---	---	---	**0.055*** (0.000)**	---
Corruption-Control (CC)	---	---	---	---	---	-0.026 (0.070)
Credit × PolS	**-0.0006** (0.042)**	---	---	---	---	---
Credit × VA	---	0.0002 (0.100)	---	---	---	---
Credit × GE	---	---	0.0001 (0.436)	---	---	---
Credit × RQ	---	---	---	-0.0001 (0.214)	---	---
Credit × RL	---	---	---	---	**-0.0005*** (0.001)**	---
Credit × CC	---	---	---	---	---	**0.0005** (0.017)**
Remittances	**0.002*** (0.000)**	**0.001*** (0.000)**	**0.001*** (0.000)**	0.0001 (0.376)	**0.001*** (0.000)**	**0.001*** (0.000)**
Time Effects	Yes	Yes	Yes	Yes	Yes	Yes
Net Effects	0.033	na	na	na	0.044	na
AR(1)	(0.018)	(0.020)	(0.017)	(0.030)	(0.022)	(0.020)
AR(2)	**(0.121)**	**(0.215)**	**(0.212)**	**(0.289)**	**(0.161)**	**(0.196)**
Sargan OIR	**(0.477)**	(0.087)	(0.088)	(0.017)	**(0.104)**	**(0.180)**
Hansen OIR	**(0.173)**	**(0.185)**	**(0.153)**	**(0.259)**	**(0.277)**	**(0.206)**
DHT for instruments						
(a)Instruments in levels						
H excluding group	**(0.393)**	(0.093)	(0.012)	**(0.110)**	(0.047)	(0.079)
Dif(null, H=exogenous)	**(0.148)**	**(0.335)**	**(0.659)**	**(0.424)**	**(0.625)**	**(0.399)**
(b) IV (years, eq(diff))						
H excluding group	**(0.349)**	(0.020)	**(0.523)**	(0.058)	**(0.367)**	(0.072)
Dif(null, H=exogenous)	**(0.158)**	**(0.623)**	**(0.109)**	**(0.547)**	**(0.259)**	**(0.416)**
Fisher	**69295.28*** **	**737.90*** **	**4183.70*** **	**5098.54*** **	**64980.50*** **	**1925.29*** **
Instruments	28	28	28	28	28	28
Countries	31	33	33	33	33	33
Observations	201	201	201	217	201	201

***,**,*: significance levels at 1%, 5% and 10% respectively. DHT: Difference in Hansen Test for Exogeneity of Instruments Subsets. Dif: Difference. OIR: Over-identifying Restrictions Test. The significance of bold values is twofold. 1) The significance of estimated coefficients and the Fisher statistics. 2) The failure to reject the null hypotheses of: a) no autocorrelation in the AR(1) & AR(2) tests and; b) the validity of the instruments in the Sargan and Hansen OIR tests. The mean of private domestic credit is 20.913. na: not applicable because at least one estimated coefficient needed for the computation of net effects is not significant.

Table 3: Governance, Finance and Inclusive Tertiary School Education (TSE)

	Dependent variable: Inclusive Tertiary Education (TSE)					
	Political Governance		Economic Governance		Institutional Governance	
	Political Stability	Voice & Accountability	Government Effectiveness	Regulation Quality	Rule of Law	Corruption-Control
TSE(-1)	**0.945*** **	**0.984*** **	**0.905*** **	**1.003*** **	**0.900*** **	**0.964*** **
	(0.000)	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**	**(0.000)**
Private Domestic Credit (Credit)	**-0.003** **	**-0.001** **	-0.0008	0.0006	-0.001	**-0.0007***
	(0.011)	**(0.014)**	(0.079)	(0.168)	(0.268)	**(0.054)**
Political Stability (PolS)	-0.017	---	---	---	---	---
	(0.621)					
Voice & Accountability(VA)	---	-0.059	---	---	---	---
		(0.106)				
Government Effectiveness (GE)	---	---	**0.120*** **	---	---	---
			(0.002)			
Regulation Quality (RQ)	---	---	---	-0.031	---	---
				(0.246)		
Rule of Law (RL)	---	---	---	---	**0.134*** **	---
					(0.000)	
Corruption-Control (CC)	---	---	---	---	---	0.022
						(0.324)
Credit × PolS	**0.003** **	---	---	---	---	---
	(0.022)					
Credit × VA	---	**0.002*** **	---	---	---	---
		(0.004)				
Credit × GE	---	---	**-0.0009** **	---	---	---
			(0.036)			
Credit × RQ	---	---	---	-0.00002	---	---
				(0.938)		
Credit × RL	---	---	---	---	-0.001	---
					(0.264)	
Credit × CC	---	---	---	---	---	**0.0009***
						(0.078)
Remittances	0.003	-0.0009	0.0007	**-0.003***	-0.0004	-0.002
	(0.186)	(0.468)	(0.621)	**(0.063)**	(0.862)	(0.327)
Time Effects	Yes	Yes	Yes	Yes	Yes	Yes
Net Effects	na	na	0.101	na	na	na
AR(1)	**(0.250)**	**(0.275)**	**(0.268)**	**(0.270)**	**(0.277)**	**(0.274)**
AR(2)	**(0.402)**	**(0.213)**	**(0.399)**	**(0.208)**	**(0.218)**	**(0.220)**
Sargan OIR	(0.052)	(0.027)	(0.022)	(0.007)	**(0.101)**	(0.011)
Hansen OIR	**(0.155)**	**(0.564)**	**(0.118)**	**(0.230)**	**(0.237)**	**(0.315)**
DHT for instruments						
(a)Instruments in levels						
H excluding group	**(0.230)**	(0.094)	(0.089)	(0.076)	**(0.112)**	**(0.105)**
Dif(null, H=exogenous)	**(0.177)**	**(0.843)**	**(0.223)**	**(0.447)**	**(0.388)**	**(0.518)**
(b) IV (years, eq(diff))						
H excluding group	**(0.270)**	**(0.257)**	**(0.312)**	(0.025)	**(0.253)**	(0.047)
Dif(null, H=exogenous)	**(0.162)**	**(0.646)**	**(0.111)**	**(0.674)**	**(0.263)**	**(0.684)**
Fisher	**102729*** **	**236990*** **	**96015*** **	**8520.82*** **	**200025*** **	**1842.11*** **
Instruments	28	28	28	28	28	28
Countries	32	32	32	32	32	32
Observations	146	146	146	146	146	146

***,**,*: significance levels at 1%, 5% and 10% respectively. DHT: Difference in Hansen Test for Exogeneity of Instruments Subsets. Dif: Difference. OIR: Over-identifying Restrictions Test. The significance of bold values is twofold. 1) The significance of estimated coefficients and the Fisher statistics. 2) The failure to reject the null hypotheses of: a) no autocorrelation in the AR(1) & AR(2) tests and; b) the validity of the instruments in the Sargan and Hansen OIR tests. The mean of private domestic credit is 20.913. na: not applicable because at least one estimated coefficient needed for the computation of net effects is not significant.

Following contemporary literature on interactive regressions (Asongu & Odhiambo, 2019e; Agoba, Abor, Osei & Sa-Aadu, 2020), in order to assess the overall impact from the relevance of finance in modulating the effect of governance on inclusive education, net effects are computed. These net effects pertain to: (i) the unconditional governance impact on inclusive education and (ii) the conditional impact from the interaction between governance and financial access. This research uses an example in order put the computation into more

perspective. For instance in the penultimate column of Table 1, the net effect from the relevance of financial access in modulating the rule of law to affect inclusive "primary and secondary education" is 0.015 ([-0.0004 × 20.913] + [0.024]). In this computation, the average value of financial access is 20.913; the unconditional effect of the rule of law is 0.024 whereas the conditional effect pertaining to the interaction between the rule of law and financial access is -0.0004.

The following findings can be established from Tables 1-3. First, financial access modulates government effectiveness and the rule of law to induce positive net effects on inclusive "primary and secondary education". Second, financial access also moderates political stability and the rule of law for overall net positive effects on inclusive secondary education. Third, financial access complements government effectiveness to engender an overall positive impact on inclusive tertiary education. Fourth, the significant estimates of remittances have the expected signs.

4. Conclusion and future research directions

This research assesses the importance of credit access in modulating governance for gender inclusive education in 42 countries in Sub-Saharan Africa using data spanning the period 2004-2014. Credit access is measured with private domestic credit. Gender inclusive education is measured with: "primary and secondary education", secondary education and tertiary education. Six good governance indicators are also employed, representing: (i) political governance (measured with political stability and "voice & accountability"); (ii) economic governance (appreciated with government effectiveness and regulation quality) and (iii) institutional governance (proxied with corruption-control and the rule of law).

The Generalized Method of Moments is employed as empirical strategy. The following findings are established. First, credit access modulates government effectiveness and the rule of law to induce positive net effects on inclusive "primary and secondary education". Second, credit access also moderates political stability and the rule of law for overall net positive effects on inclusive secondary education. Third, credit access complements government effectiveness to engender an overall positive impact on inclusive tertiary education. In what follows, policy implications are discussed with some emphasis on Sustainable Development Goals, notably, the relevance of governance, finance and inclusive education (in this order).

First, of the established positive net effects, government effectiveness and the rule of law are apparent twice while political stability is apparent once. (i) The importance of

political stability is consistent with stylized facts underpinning the contemporary development constraints in Africa because irrespective of how good and conducive standards of governance are, political stability is very relevant for the promotion of economic development because it provides enabling conditions from which most other development dynamics build upon. (ii) As for government effectiveness, the relevance of the governance dynamic is not so surprising because the dynamic is conceptually understood as the formulation and implementation of policies that deliver public commodities. Like health and other social amenities, inclusive education is a public commodity that can be tailored to provide the same opportunities for the female gender vis-à-vis the male gender. (iii) Concerning the rule of law, the findings further expose the imperative for both citizens and the State to respect institutions that govern interactions between them, especially in relation to policies that are designed to involve more women in the education sector, contingent on access to finance that is needed for schooling projects at various levels of education.

Second, the favorable complementarity of financial access is a further indication to the fact that if the apparently low levels of access to finance in SSA are consolidated, more positive ramifications on inclusive education can be expected. Hence, the attendant policy implication is that more should be done by policy makers to enhance conditions for financial access, especially from segments of the population that do not have bank accounts. In essence, as documented by Tchamyou *et al*. (2019), SSA is the region in the world with the lowest level of financial access. Therefore, it is logical to infer that enhancement of access to credit (i.e. a proxy of financial access used in this study) in the sampled countries will go a long way to increasing inclusive development and by extension inclusive education. Women in Africa have been documented to be among the poorest because they are excluded from the formal economic sector (Efobi *et al*., 2018). In the post-2015 agenda, empowering more women by means of good governance and financial access will significantly contribute towards the achievement of SDGs in the sub-region.

Third, inclusive education for girls and women directly concerns two main SDGs, notably: (i) SDG-4 (i.e. "*ensure inclusive and equitable quality education and promote lifelong learning opportunities for all*") and (ii) (i) SDG-5 (i.e. "*achieve gender equality and empower all women and girls*"). In the light of the stubbornly high poverty rate in Africa and the unfavorable incidence of inequality in the effect of economic growth on poverty reduction, taking more females on board the education sector (and by extension the economic sector) will promote the drive towards most poverty- and inclusion-oriented SDGs, by simultaneously contributing to economic development and enhancing the negative

responsiveness of extreme poverty to economic growth. This inference builds on the documented fact that the response of extreme poverty to economic growth decreases with increasing levels of inequality (Tchamyou *et al*., 2019; Asongu & le Roux, 2019). Moreover, in the sustainable development era, it is unlikely for any country to politically, socially and economically prosper if majority (i.e. girls and women) of its population is uneducated.

It is important to articulate that education is related very closely to most SDGs. In essence, some amount of education is related to the achievement of: SDG-1 related to extreme poverty; SDG-2 pertaining to hunger; SDG-5 on gender equality; SDG-3 on healthy living; SDG-10 on economic equality; SDG-8 on employment and SDG-4 related to quality education. In essence, well tailored and inclusive education programs can enhance SDG-6 related to water and sanitation; SDG-15 on the deterioration of the ecosystem and SDG-7 on climate change. In summary, because education is potentially associated with a plethora of development externalities, it can facilitate the achievement of most SDGs. Hence, inclusive systems of education in this era of knowledge-based economies are relevant for SDG-17 on Global Partnership for Sustainable Development because education is also a source of specialized knowledge that is relevant for, *inter alia*: reducing poverty and inequality; environmental protection and management of exhaustible resources.

Future studies can focus on assessing if the findings in this research can withstand empirical scrutiny when observed from country-specific analytical frameworks. This suggestion for country-specific analyses is motivated by the need to inform policy with country-specific findings in order to tailor more targeted policy implications. This recommendation builds on a fundamental caveat in the GMM approach: accordingly, country-specific effects are eliminated in order to avoid the correlation between the lagged outcome variables and the country specific effects which is a cause of endogeneity.

Appendices

Appendix 1: Definitions of Variables

Variables	Signs	Definitions of variables (Measurements)	Sources
Inclusive Education	PSSE	School enrolment, primary and secondary (gross), gender parity index (GPI)	WDI
	SSE	School enrolment, secondary (gross), gender parity index (GPI)	WDI
	TSE	School enrolment, tertiary (gross), gender parity index (GPI)	WDI
Political Stability	PolS	"Political stability/no violence (estimate): measured as the perceptions of the likelihood that the government will be destabilised or overthrown by unconstitutional and violent means, including domestic violence and terrorism"	WGI
Voice & Accountability	VA	"Voice and accountability (estimate): measures the extent to which a country's citizens are able to participate in selecting their government and to enjoy freedom of expression, freedom of association and a free media"	WGI
Government Effectiveness	GE	"Government effectiveness (estimate): measures the quality of public services, the quality and degree of independence from political pressures of the civil service, the quality of policy formulation and implementation, and the credibility of governments' commitments to such policies".	WGI
Regulation Quality	RQ	"Regulation quality (estimate): measured as the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development".	WGI
Corruption-Control	CC	"Control of corruption (estimate): captures perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as 'capture' of the state by elites and private interests"	WGI
Rule of Law	RL	"Rule of law (estimate): captures perceptions of the extent to which agents have confidence in and abide by the rules of society and in particular the quality of contract enforcement, property rights, the police, the courts, as well as the likelihood of crime and violence"	WGI
Financial Credit	Credit	Privates Domestic Credits (% of GDP)	FDSD
Remittances	Remit	Remittance inflows to GDP (%)	WDI

WDI: World Bank Development Indicators of the World Bank.WGI: World Governance Indicators of the World Bank. FDSD: Financial Development and Structure Database of the World Bank.

Appendix 2: Summary statistics (2004-2014)

	Mean	SD	Minimum	Maximum	Observations
Primary & Secondary School Enrollment	0.919	0.111	0.600	1.105	307
Secondary School Enrollment	0.867	0.214	0.333	1.422	287
Tertiary School Enrollment	0.731	0.433	0.064	3.295	232
Political Stability	-0.490	0.867	-2.687	1.182	528
Voice & Accountability	-0.509	0.683	-1.780	0.970	462
Government Effectiveness	-0.711	0.599	-1.867	1.035	462
Regulation Quality	-0.608	0.529	-1.879	1.123	462
Corruption-Control	-0.577	0.590	-1.513	1.139	462
Rule of Law	-0.651	0.604	-1.816	1.007	462
Privates Domestic Credit	20.913	24.628	0.873	150.209	440
Remittances	4.313	6.817	0.00003	50.818	416

S.D: Standard Deviation.

Appendix 3: Correlation matrix (uniform sample size : 160)

Inclusive Education			Good Governance								
PSSE	SSE	TSE	PolS	VA	GE	RQ	CC	RL	Credit	Remit	
1.000	0.872	0.615	0.528	0.601	0.626	0.584	0.638	0.668	0.430	0.328	PSSE
	1.000	0.710	0.531	0.546	0.574	0.491	0.664	0.603	0.460	0.509	SSE
		1.000	0.387	0.311	0.480	0.300	0.521	0.437	0.312	0.258	TSE
			1.000	0.816	0.792	0.774	0.845	0.831	0.478	0.156	PolS
				1.000	0.858	0.839	0.829	0.887	0.568	0.180	VA
					1.000	0.920	0.868	0.936	0.630	0.040	GE
						1.000	0.804	0.904	0.617	-0.038	RQ
							1.000	0.911	0.584	0.214	CC
								1.000	0.677	0.118	RL
									1.000	0.006	Credit
										1.000	Remit

PSSE: Primary and Secondary School Enrollment. SSE: Secondary School Enrolment. TSE: Tertiary School Enrolment. PolS: Political Stability. VA: Voice & Accountability. GE: Government Effectiveness. RQ: Regulation Quality. CC: Corruption-Control. RL: Rule of Law. Credit: private domestic credit. Remit: Remittances.

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